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TRANSMITTAL FORM (to be used for all correspondence after initial filing)	Application Number	10/082,455	
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	Examiner Name	Sharon Polk	
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Dear Examiner Polk,

To address the objections cited to the informality of the independent claims 1, 6, 11 and dependent claims 5, 10, 15 and 20, the claims have been amended. ~~The~~ has been replaced with an, fixing the mistake.

Turning to the rejections of claims 1-3, 6-9, 11-13 and 16-18 under 35 U.S.C. 102 as being anticipated by Hummel, US 4,594,515. Hummel reads the state of dc paths containing switches 38, 40, 64, 66 and 68 and sets the state of ac switches 50, 80 and 100. Hummel does not read ac path states; it sets ac path states. The present invention ascertains or reads the state of ac paths; it does not read dc path states. In the Detailed Description of Invention of the present invention the state of switches S1 and S2 can not be set by dc as in Hummel, they are mechanical switches whose state (open/closed) is set by the position of the door and the level of water respectively. The present invention ascertains the state of S1 and S2 allowing the control to respond accordingly.

The choice of the word "determine" was poor as it can mean either set or ascertain. Both the specification and the claims have been amended, replacing ~~determine~~ with ascertain and stating that the switch or load being ascertained is ac. This should make clear the difference between Hummel and the present invention.

With regard to claims 2, 7, 12, 17 Hummel teaches using dc switches 38, 40, 64, 66 and 68 to set the state of ac switches 50, 80 and 100. Whereas the present invention ascertains the state of an ac path to ascertain whether an ac switch is open or closed. In computer terms, Hummel writes to ac switches and the present invention reads ac switches.

With regard to 3, 8, 13 and 18 Hummel teaches that the state of an ac path set by dc switches indicates whether the load is functioning, i.e., turned on. Hummel does not scan ac paths; it assumes the loads 58, 109 and 108 are functional and will function when their respective ac switches are closed. Hummel does not ascertain load component functionality; it assumes the load will function when energized. The present invention determines if the load is functional by ascertaining the state of the ac path containing the load. If the ac path is open the load is assumed to be non-functional. The present invention could be used to verify the functionality of the load components operated by Hummel.

With regard to 6 and 16, claim 16 is amended to state the connection is made through solely non-reactive components. Further, in Hummel's abstract it states that the ac power through the loads is isolated from dc. This is accomplished by optoisolators 44, 74 and 98. There is no electrical connection between the ac paths and dc; the signal is carried by light across optoisolators. The present invention has an electrical connection between ac and dc inputs. Claims 1, 6, 11 have been amended to state electrical connection, emphasizing the connections of the present invention do not isolate.

With regard to claim 11 the appliance has been deleted to acknowledge that the claim must stand on the merit of its difference from Hummel on the basis that Hummel SETS ac path states and the present invention READS ac path states.

In regard to rejections under U.S.C. 103(a) of claims 4, 9, 14 and 19, since Hummel does not ascertain the state of ac paths the burden would fall to Szynal. Szynal does connect ac nodes and dc nodes through passive components while employing a power supply isolated from all ac lines, as does the present invention. However Szynal uses a different method to determine the state of an ac path than the present invention. Szynal uses a single input 46 as conditioned by 28 to ascertain the state of ac switching. The shape of the lone signal indicates the state of the ac switch. The present invention compares the signals on a plurality of dc inputs to determine the state of an ac path.

While the one input method of Szynal sounds simpler than the present invention in practice it incurs the use of more components. Further, Szynal is very limited in the ac paths it can read. It is limited to a neutral side switch. Further, Szynal does not offer a means for determining the functionality of load component 12. If 12 were to fail (become open) the signal on 46 would remain as described. When 26 is closed 27 is at neutral regardless of the load 12. When 26 is open 27 is connected to hot through 40 and if functional through 12; in either case the direct connection between hot and 46 through 44 pulls 46 high. Finally, Szynal requires a reactive component 42 to shape the signal.

Both Szynal and the present invention isolate supply voltages from hot and neutral as well as ac ground. A common ground is not used in consumer applications, only the chassis is grounded. The reason common ground is avoided is that there is a very real possibility that the device and hence the chassis will not actually be grounded because the device was improperly installed, particularly in older homes, where ac outlets do not have a ground wire. Connecting a supply voltage to an improperly grounded chassis is hazardous because a failure of power supply isolation would render the chassis "live". The specification has been amended explicitly stating the industry requirement that the supply be ungrounded.

5,184,026 Breartuin teaches a solution to the common ground problem, however Breartuin still requires a fixed source-supply voltage. Breartuin isolates ac ground from the supply voltages as required for chassis safety. However in place of using ac ground as a reference Breartuin creates one using a power supply that does not isolate supply voltage from ac. Breartuin establishes a reference voltage (circuit ground) a dc voltage drop lower than higher of the ac lines (abstract). Unfortunately while the chassis is not a threat to safety the supply voltages are in this approach. This approach is acceptable if the device has sufficient means to prevent contact with supply voltages.

However, in any device where there is a reasonable potential for human contact with a supply voltage this approach is unacceptable. This includes control panels where a thin membrane separates the operator from switches and display elements that are at control voltage. The membrane can be easily damaged allowing contact with a control voltage. The industry requires two layers of protection – the isolation of the supply and the material of the control panel.

In the present invention supply voltages are isolated both from ground and ac. Further it is preferred that the sensing components connecting ac and dc limit ac current through a grounded operator to a safe level. In Breartuin the sensing components can not do this (even if the components had infinite impedance) as the power supply has lowered the

impedance between ac and supply such that shock or worse may occur if contact is made with a supply voltage.

Breartuin also does not demonstrate a technique for determining the functionality of an ac load component. If Z1 were to fail (open) the input of the sensing means 5 would be floating when S were open, then what state would 13 be in? It certainly is not obvious and Breartuin does not address the issue.

Breartuin purposely created the reference voltage that requires C1 to block dc. If Breartuin understood how to adapt the approach to supplies isolated from ac which are required by appliance manufacturers why reduce safety and add expense in the preferred embodiment?

Isolating supply voltages from all ac lines, complicates the design of the sensing means. Szyal uses only one sensing connection, one switch, assumes a functional load component and assumes the proper ac polarity, simplifying sensor design at the expense of limiting the ac paths it detects. In the present invention, each electrical connection to ac, the polarity of the device's connection to ac, and the state of all ac switches and loads affects the source-supply voltage. The supply voltages in the present invention can "float" anywhere between hot and neutral and change as the state of any ac conductor changes. Breartuin does not address these problems; he does have to; his solution is to fix the source-supply voltage.

Turning to 3,862,439 Coccio is a zero crossing detection circuit producing one signal, a pulse at zero crossings; it does not compare a plurality of signals. Further no means is shown to safely allow an electrical connection between ac and the control, rather Coccio shows an isolating component transformer 51. The signal is transmitted by magnetic field across 51.

4,305,122 Smith et al the method uses a power supply with ac (assumed neutral) and circuit ground in common. In consumer appliances the supply voltages should be safe even if hot and neutral are reversed when the consumer installs the device. In this case circuit ground would be tied to hot if improperly connected to ac - a very unsafe condition. Unfortunately, Smith requires circuit ground be in common with an ac line for the sensing operation.

Further the input signals on p17 and p13 are not compared to each other to determine ac path state. They are compared to the reference -ground set by the supply. Smith does not teach how to determine the functionality of a load. If T20 and T18 were floating what are the signals and how would one distinguish them from either zero voltage input or ac? Smith also uses non-passive components 106 and 92 to sense.

4,329,596 Marcade uses the control to set ac path states, not ascertain ac path states as in the case of Hummel. The amending of the specification and claims to use ascertain instead of ~~determine~~ should clear up the confusion.

4,866,955 Blair et al uses optoisolator 56 to isolate ac switch from control whereas the present invention uses an electrical connection. There is no electrical connection through the optoisolator; the signal is carried by light. Nor is 56 a passive component.

5,694,793 Nishimura uses the control to set the state of ac switching; Nishimura does not ascertain ac path states. The control of the present invention ascertains the state of ac switches. Changing ~~determine~~ to ascertain in the specification and claims should clarify as with Hummel.

5,735,007 Choi uses the control to set both ac and dc path states; Choi does not ascertain ac path states. The control of the present invention ascertains the state of ac switches. Changing ~~determine~~ to ascertain in the specification and claims should clarify as with Hummel.

Sincerely,

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